Remarks/Arguments:

Claims 1, 5-14, 16-20, 22, 23, 25-29, and 32-34 are pending. Applicant has amended claims 5, 11, and 32 to correct a clerical error in the claim language, without changing the scope or meaning of these claims.

Rejection under 35 USC §112 ¶1

Claim 11 has been rejected under 35 USC §112 ¶1 as failing to comply with the enablement requirement. Applicant respectfully submits that the subject matter claim 11, as amended, is described in the written description in such a way as to enable one of skill in the art the practice the invention recited in claim 11 for the reasons described below.

The subject matter cited by in the Office Action as lacking enablement, namely that, "...the array of sub-beams [formed by a DOE and a telecentric f-θ lens] has a density of 1/N times an image density of the reduced-size pattern on the work piece times a demagnification factor of the demagnifier," was explicitly described in the written description of the originally filed application in claim 15. Original claim 15 depended from claim 11. Claim 11 was amended to include this subject matter and original claim 15 was canceled by Applicant's response of March 30, 2006. In this response, Applicant has amended paragraph [0077] to include the subject matter originally disclosed in claim 15, as well as copying a description of the purpose of the specified sub-beam density from paragraph [0014]. Thus, no new matter has been added in this amendment.

Diffractive optical elements (DOE's) and telecentric f-θ lenses are known in the art of laser machining. Figure 9 of the present application illustrates how DOE 806 and telecentric f-θ lens 808 may be used to create an array of substantially parallel sub-beams from a single beam of light. As stated in original paragraph [0077], these optical elements may, "...produce an array of sub-beams similar to the array of sub-beams formed by imaging mask 114." The subject matter in question involves selecting parameters of DOE 806 and telecentric f-θ lens 808 to achieve a specific density of the sub-beams in the resulting array. Applicants respectfully submit that one skilled in the art of laser machining at the time of the filing of the present application would have understood geometric optics sufficiently to specify the necessary parameters.

Therefore, Applicants respectfully submit that the subject matter of claim 11 is enabled by the written description. Reconsideration of this claim is requested.

Rejections under 35 USC §103(a)

Claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. (US 6,433,303, Liu I) in view of Liu et al. (US 6,433,305, Liu II) and Smith (US 5,296,673). Applicants respectfully submit that claims 1, 5, 7-14, 17-20, 22, 23, 25-29, and 32-34 are not subject to this rejection for the reason set forth below.

Independent claim 1 of the present application, recites a feature that is neither disclosed nor suggested by Liu I, Liu II, or Smith, singly or in combination, namely:

> ...a translation stage coupled to the image interpolating mask for moving the image interpolating mask and the array of sub-beams in a perpendicular direction to the optical path such that the array of sub-beams is moved in a sequence to form the reduced-size pattern on the work piece,... (Emphasis added.)

Independent apparatus claims 5, 8, 11, 17, 20, and 23 include a similar feature:

> ...a translation stage configured to move the array of sub-beams in a perpendicular direction to the optical path,...

as do independent method claims 26 and 32:

> ...translating the array of sub-beams N times in the perpendicular direction to the optical path;...

This feature is described, for the embodiments that include a mask (i.e. those recited in independent claims 1, 5, 8, 20, and 32), in paragraph [0044] with reference to Figure 1, which illustrates translation stage 136 that may be used to translate mask 114 and, thus, the array of sub-beams. It is also described, for the embodiments that include a DOE (i.e. those recited in independent claims 11, 17, 23, and 26), in paragraph [0079].

Because Liu II does not disclose or suggest the use of a mask, DOE, or array of sub-beams, Liu II cannot disclose a means for translating an array of sub-beams in a direction perpendicular to the optical path.

Liu I discloses using a mask or a DOE to form an array of sub-beams; however, Liu I does not disclose or suggest translating the array of sub-beams. Therefore, Liu I does not disclose a means for translating an array of sub-beams in a direction perpendicular to the optical path.

Smith discloses using a mask to form an array of sub-beams. Smith also does that "...mask 4 can be moved along the optical axis by means not shown... ...to provide a method of altering the image size and thus the spacing of the apertures." Col. 4, lines 60-64. Smith does not, however, disclose or suggest translating the image formed by the mask in a direction perpendicular to the optical path.

Therefore, because the combination of Liu I, Liu II, and Smith fails not disclose or suggest these features of independent claims 1, 5, 8, 11, 17, 20, 23, 26, and 32, claims 1, 5, 8, 11, 17, 20, 23, 26, and 32 can not be subject to rejection under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Liu II and Smith. As claims 7, 9, and 10 depend from claim 1, claims 12-14, 18, and 19 depend from claim 11, claim 22 depends from claim 20, claim 25 depends from claim 23, claims 27, 28, and 34 depend from claim 26, and claims 29 and 33 depend from claim 32, these claims are not subject to this rejection as well.

Claims 6 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Liu I in view of Liu II and Smith and further in view of Noddin (US 5,973,290). Applicants respectfully submit that claims 6 and 16 are not subject to this rejection for the reason set forth below.

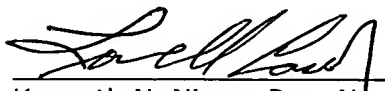
Noddin uses a single beam spot to form vias in a work piece. Therefore, Noddin cannot disclose or suggest a means for translating an array of sub-beams in a direction perpendicular to the optical path.

Claim 6 depends from independent claim 1 and claim 16 depends from independent claim 11. Thus, the combination of Liu I, Liu II, and Smith have at least the same deficiencies with regard to claims 6 and 16 as described above with regard to claims 1 and 11. Noddin cannot overcome these deficiencies. Therefore, claims 6 and 16 can not be subject to rejection under 35 U.S.C. § 103(a) as unpatentable over Liu I in view of Liu II and Smith and further in view of Noddin.

The remaining dependent claims have been amended to properly depend from the independent claims.

Therefore Applicants respectfully request reconsideration and allowance of claims 1, 5-14, 16-20, 22, 23, 25-29, and 32-34.

Respectfully submitted,



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